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DIVESTITURE, JAPANESE STYLE

There are different opinions about whether to break up NTT

MICHIGAN PUMPS PROFITS INTO NETWORK

Incentive plan allots some profits for construction

SECURITY CONCERNS HAUNT SOVIET FIBER CABLE

U.S. agency objects to U S West's role

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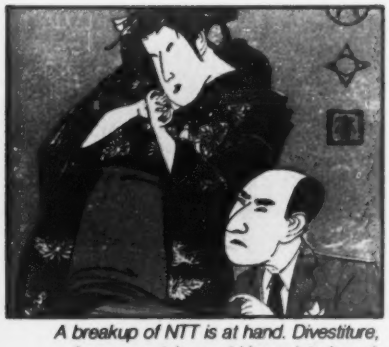

A breakup of NTT is at hand. Divestiture, Japanese style, could be painted much different than divestiture, American style. Will it be a period characterized by touches of style, grace and efficiency? Cover art by James McKiernan

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In My Opinion

Mold-breaking In Fredericksburg

Fredericksburg, Va., may seem an unlikely birthplace for a whole new global telecommunications order, but many observers believe that a meeting hosted there last month by the T-1 Committee of the United States could make it turn out to be just that.

Participating in the first Interregional Telecommunications Standards Conference (ITSC) were the movers and shakers of world telecommunications standards-making. In addition to senior T-1 personnel from the U.S., the meeting drew the heads of Japan's Telecommunications Technical Committee (TTC), the European Telecommunications Standards Institute (ETSI), the CCITT and its radio counterpart, the CCIR.

What the assembled luminaries ostensibly did at Fredericksburg was to formally recognize that present international standards procedures are occasionally unfocused, sometimes out of touch with market realities, and often duplicated from one location to another.

They agreed that there is a need for the informal exchange of ideas in a timely fashion between national, regional and international telecommunications standards bodies in a new forum, namely the ITSC. They also proposed to lobby the International Telecommunication Union for more resources for the CCITT and CCIR, and said that the exchange of information between the various standards bodies would be greatly expedited by the establishment of a dedicated electronic information system.

More importantly, though, the meeting promulgated the so-called Fredericksburg Plan, which envisions standardization projects with well-defined objectives produced by specific deadlines.

It also lays out a general sequence of events: Standards bodies will convene periodically to advance global standards; ad hoc informal meetings for information exchange will be held; plans prepared at such meetings will be compared with the CCITT's work program; a subset of activities will be identified in terms of objectives, scope and timescale; and the CCITT and CCIR will use such data to set future program priorities.

The Fredericksburg agenda is laudable in as much as the greater involvement of users and manufacturers is implied in an accelerated standards-making process.

So far so good. Leaving aside the considerable logistical difficulties of organizing greater teamwork between the T-1, ETSI and TTC bodies, however, one might question the efficacy of any attempt to formalize cooperation between the CCITT's three main potential rivals in the world standards-making and implementation arena.

Admittedly, many of the Fredericksburg proposals were actually advanced by CCITT Chief Theo Irmer last year, and both his organization and the CCIR are probably intended to be "first among equals" in the future ITSC.

The temptation for some will be to regard the CCITT and the CCIR as part ITSC conscience, part compliant observer for the world's telecommunications "have-nots." Such a fate should be avoided at all cost.

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INTERTEC

Asia's high-fiber diet

Southeast Asia is expected to be a global economic powerhouse in the 21st century, and the telecom network will play a major role. Fiber optics are, of course, a big part of the plan

JOHN WILLIAMSON, International Editor

Accompanying the remarkable economic and industrial achievements of the Asia-Pacific region in the last two decades have been ambitious plans to expand and modernize local telecommunications infrastructures. Initially, fiber played a minor role in this expansion.

In 1986 there were less than 100,000 optical circuits in use throughout the region, according to Pyramid Research Inc. The research firm estimates, however, that by the end of this decade, just 10 countries in the region will be using at least 1.3 billion fiber circuits.

In deploying fiber optic technology, many of the Asia-Pacific countries have several advantages not always present elsewhere.

Distances between national and regional population centers are often considerable, a circumstance that favors the long-haul economics of fiber. With the exception of Japan, in many parts of the Asia-Pacific region, copper-based telecommunications infrastructures are not mature or pervasive and there is little economic or historic commitment to copper.

A relatively late start in the commercial use of the technology provides some of the Asian countries with the opportunity to leapfrog earlier generations of fiber and reap the benefits of the longer repeater spacing and higher bit rates of systems now appearing on the market.

Finally, the region's involvement with fiber coincides with a substantial worldwide growth in demand for international bandwidth-hungry services such as very high-speed data, videoconferencing and computer-aided design/computer-aided manufacturing.

If the Asia-Pacific fiber market is booming, it's also relatively open. Notwithstanding the technological muscle of Japan, and indigenous efforts in locations such as Australia, China, India, South Korea and Taiwan, non-regional suppliers have played a major part in building the market and are expected to continue to do so.

James McCarthy, a fiber optics industry specialist at the U.S. Department of Commerce, points out, for example, that, although India intends to emphasize domestically produced hardware, Siecor has supplied cable and interconnect equipment for a $10-million system linking New Delhi and Bombay.

Right now there are no particular suppliers that dominate particular routes or operators. Even with the long-haul, sub-sea systems that are beginning to criss-cross the Pacific, there appear to be less of the political preferences seen in the North Atlantic underwater cable business.

The proliferation of sub-sea optical systems in the Pacific Rim is an indication of the international importance of the region. In the same way, the most recently planned routes indicate a shift in local priorities and the growth of intraregional interests.

The first operational optical trans-Pacific system, TPC-3/HAW-4, reflects the historic U.S.-Japanese orientation of regional commerce. The 3 x 280 Mb/s system joins Japan and Guam to the California coast through Hawaii.

The U.S.-Japan communications axis remains important. For example, the private enterprise North Pacific Cable system will provide the first direct fiber link between Japan and the continental United States. The 8300-kilo-

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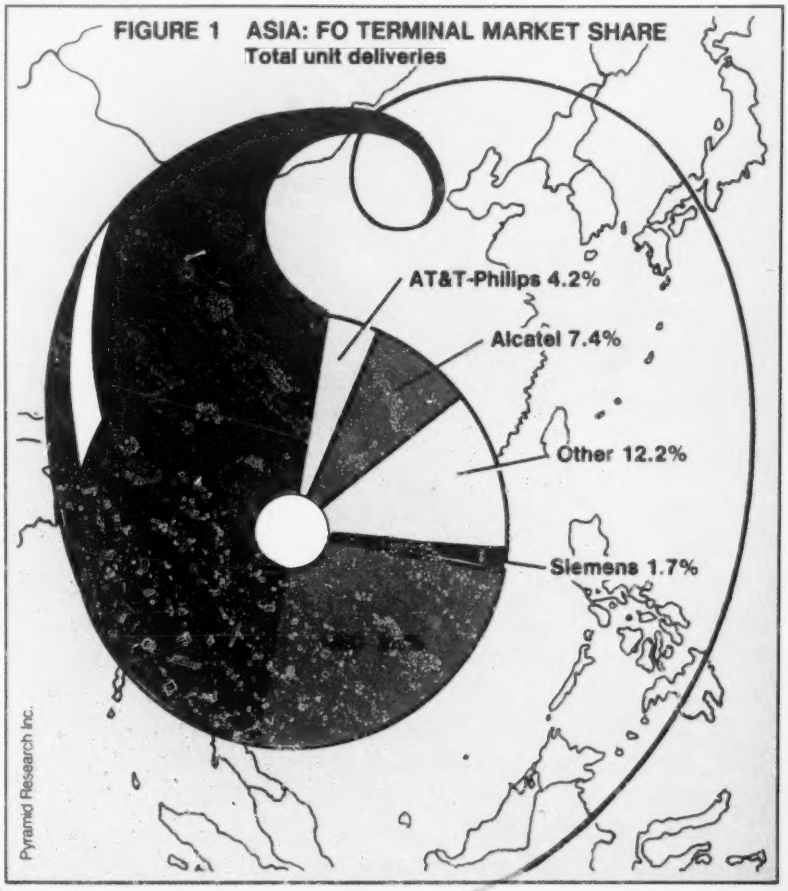
FIGURE 1 ASIA: FO TERMINAL MARKET SHARE
Total unit deliveries



meter NPC, which is scheduled for cutover later this year, will run at 1.26 Gb/s, a 50% capacity increase over the original plan. And it will have a 420-Mb/s underwater spur to Alaska. TPC-4, a $373-million public system, will run from Japan to Point Arena, Calif. TPC-4 is scheduled to begin service in late 1992, and reports suggest that capacity on the 1.55-micron cable is already fully booked.

Two other planned long-haul systems, PacRim East and PacRim West, signal some modification in the balance of regional interests. The first, scheduled for operation in 1993, will run from Auckland, New Zealand, to Hawaii. The second, three years later, will link New South Wales, Australia, with Guam. Both PacRims will then feed into TPC-3/HAW-4, reaching Japan in the East and California in the West.

Should it ever be built, a 13,500-kilometer trans-Siberian system (TSL) will mark a radical departure from traditional Pacific Rim telecommunications traffic and interest patterns. Running to the North Pacific coast of the Soviet Union and having spurs to Scandinavia, West Germany and Italy at its Western end, the $500-million system is being proposed by a consortium made up of U S West, the Soviet Ministry of Posts and Telecommunications, Deutsche Bundespost Telekom, British Telecom, Kokusai Denshin Denwa of Japan, Stet of Italy, OTC of Australia, and Denmark's PTT and Great Northern Telegraph Co.

If the TSL gets the go-ahead from the Paris-based Coordinating Committee on Multilateral Export Controls, and mutually satisfactory ownership and financing arrangements can be agreed upon between the participants, the system could be carrying traffic by the mid-1990s.

At that point it may face competition from a proposed $600-million sub-sea system currently being considered by France and Singapore. Running westward across the Indian Ocean before turning north into the Red Sea and into the eastern Mediterranean, the so-called Southeast Asia/Middle East/Western Europe 2 (SEA-ME-WE 2) cable will link Singapore and France.

However, recent reports suggest that an analog coaxial cable predecessor, SEA-ME-WE 1, has not been an unqualified commercial success and that France is now lobbying to join the would-be trans-Siberian operators.

Apart from long-haul, an explosive growth of shorter range optical sub-sea systems in the Pacific is indicative of the growth in the interdependency of local economies. Included are planned links between Guam, the Philippines and Taiwan; Hong Kong, Japan and Korea; Singapore and Brunei; Singapore and Hong Kong; Hong Kong and Taiwan; Hong Kong and the Philippines; and Australia and New Zealand.

Public and private terrestrial filter networks are multiplying at the back of these sub-sea systems.

In Australia, around 100,000 fiber kilometers of interstate trunk links, together with a slightly higher total of intrastate and metropolitan systems, had been installed by the spring of 1989. A major addition was recorded toward the end of the year with the commissioning of a 2617-kilome-

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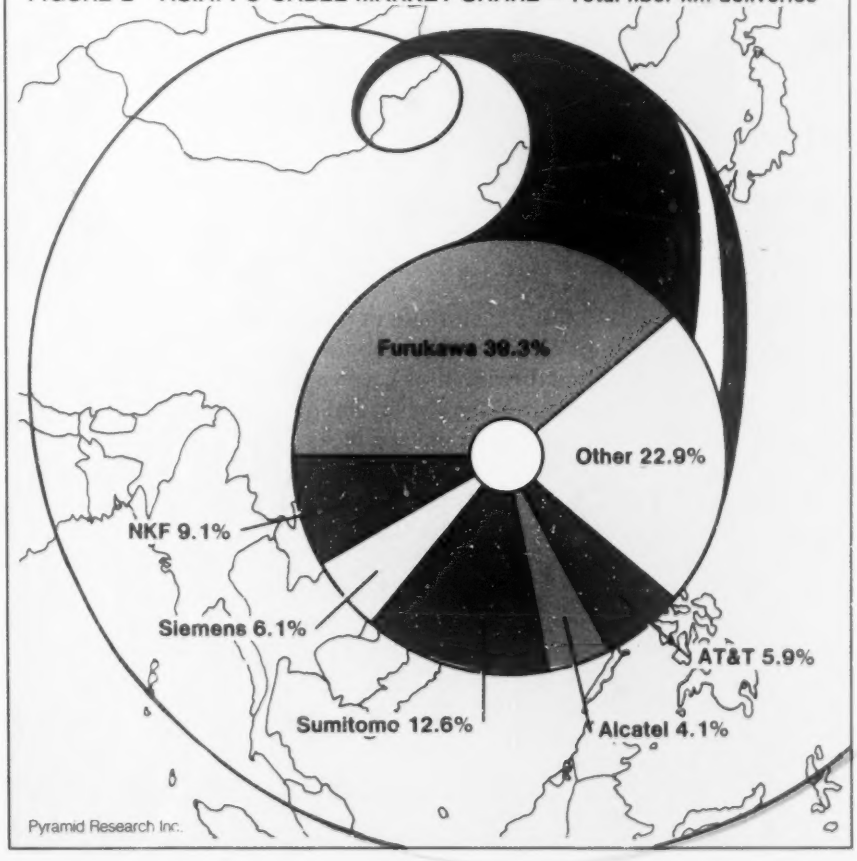
NTT demonstrates the light fantastic

Earlier this year Nippon Telegraph and Telephone Corp. announced a successful 222.3-kilometer coherent optical transmission experiment using an erbium-doped fiber amplifier that employed direct optical amplifying technology.

In the experiment, 20 of the all optical amplifiers were placed at approximately 80-kilometer intervals in the 222.3-kilometer fiber, and optical signals of 2.488 Gb/s were successfully transmitted.

This technology could have a major impact on the configuration of NTT's telecommunications network, making it possible to directly connect all major domestic cities, whether by land or undersea cable, without converting to electric signals as in conventional amplification. Further development of the technology should enable direct transmission over distances greater than 10,000 kilometers, such as right across the Pacific Ocean.

FIGURE 2 ASIA: FO CABLE MARKET SHARE — Total fiber-km deliveries



ter link between Perth and Adelaide.

Overall, Telecom Australia is embarking on a massive trunk scheme to link all the major urban communities, including Hobart in Tasmania, with fiber by the middle of the decade. By 1989, in addition to the Perth-Adelaide system, Melbourne, Canberra and Sydney had been joined in a southeast coast network, and most of the distance between Adelaide and Darwin in the far north had been fibered.

Private fiber systems also are increasing in number, with one of the most recent being built for the Australian National Railroad between Port Augusta and Kalgoorlie.

The deployment of terrestrial fiber and the involvement in underwater systems—the international carrier OTC is the largest shareholder in the PacRim project—has fostered the growth of local manufacturing. A notable venture is between Alcatel's Australian and Submarcom subsidiaries, OTC and Telecom New Zealand.

Optical and fiber research and installation techniques have also prospered. The University of Sydney, for example, is gaining an international reputation in specialized fibers, while the installation of Telecom Australia's Perth-Adelaide link accelerated the development of a zero tension plough that ploughs and lays fiber cable in one action.

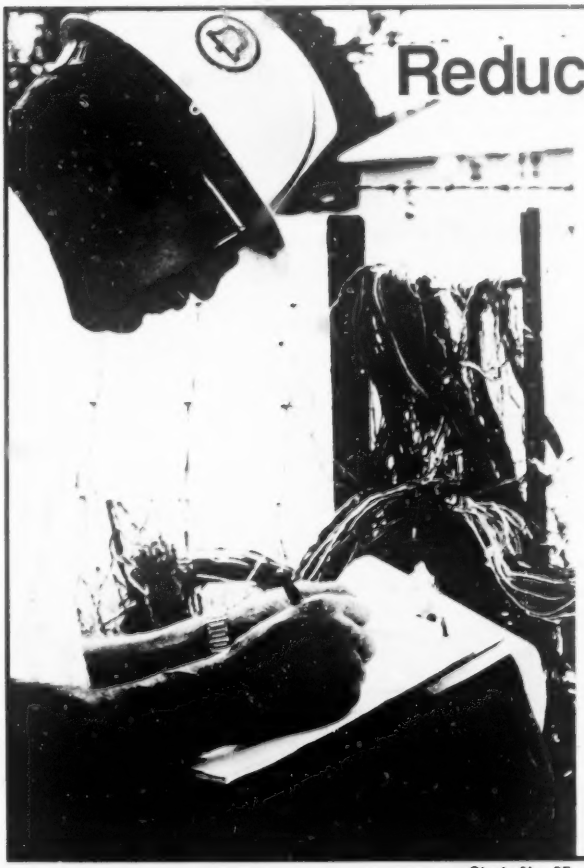
China also is building up an indigenous fiber industry. A current estimate is that local production will reach 300,000 fiber kilometers by the year 2000, although fiber quality has not been very good in the past.

Research and development carried out at more than 70 Chinese centers has established expertise in areas such as coherent laser sources and optical switches. Many field trials of locally designed transmission systems have been carried out since the early 1980s, with several beginning service.

In 1989, AT&T established a joint venture with a local partner in Shanghai to build, sell and service lightwave communications systems. And overseas suppliers, including GPT, STC, Philips, Nokia, SEL, Furakawa, Telettra and Pirelli, have been involved in the construction of public and private systems. Both AT&T and GPT have participated in the major project to link Hong Kong, Guandong, Macau and the Pearl River Delta in a ring-shaped digital fiber network.

Hong Kong began to lay optical fiber cable in its junction network in 1981. At the end of 1989 this network contained 22,000 fiber kilometers in 900 route kilometers of cable.

India's involvement with lightwave communications stretches back to the early 1980s with the use of multimode systems. Its five-year public telecommunications plan, which ends this year, sees the deployment of fiber in and between such major centers as New Delhi, Calcutta, Bombay



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and Madras. The emphasis is on locally produced hardware. The Indian railroad is a major private user of fiber.

Japan leads the region—and in some particulars, the world—in the development of lightguide technology. NTT completed a nationwide 400-Mb/s trunk fiber backbone in the mid-1980s. This backbone has been extended with 1.6-Gb/s links, and a variety of higher-speed systems are being looked at, with widespread transmission at 2.4 Gb/s as a possible long-term aim. Fiber also will play a big part in NTT's integrated services digital network plans.

The additional opportunities opened up by local progress in new technologies such as fiber, in the view of NTT Executive Vice President and Representative Director Eisuke Kusaka, were partly responsible for the appearance of competitive Japanese carriers after 1985. The new carriers have repaid the compliment, with both Teleway Japan and Japan Telecom building 400-Mb/s trunk fiber systems along the Tokyo-Osaka-Nagoya corridor and sparking a long-distance price war with NTT.

Japan continues to dominate many areas of international optical research and development (see page 52). In parallel, manufacturing has gone from strength to strength. In the latest complete figures available for the fiscal year that ended March 31, 1989, the Japanese Optoelectronic Industry and Technology Development Association (OITDA) indicated that domestic production of optoelectronic equipment had risen 20% over the previous one-year period. Connectors, couplers, isolators and other fiber optic components showed increases, as did systems for public and private networks.

Singapore, which has so far imported the majority of its capital telecommunications plant, had 10,000 fiber kilometers of lightwave systems in use in early 1989.

In South Korea, a 45-Mb/s system was developed in 1985 and a 90-Mb/s system the following year. The former is currently used to carry the country's long-haul domestic traffic. Speaking at a conference in Singapore in 1989, Shin Yun-Sik, vice minister of communications for South Korea, said that in the next five years a main priority would be to develop and install single-mode systems at 565 Mb/s and 2.26 Gb/s. Schemes to run sub-sea fiber along the coast of South Korea and across to China also have been reported.

In Taiwan, optical transmission is being progressively implemented in the junction network and has been used in videoconferencing systems. A reported priority is the introduction of synchronous optical network technology.

Investment in modern telecommunications technologies such as fiber optics is both the cause and effect of expanding economic activity. This may be a truism, but nowhere is its validity better exemplified than in the Asia-Pacific region. T

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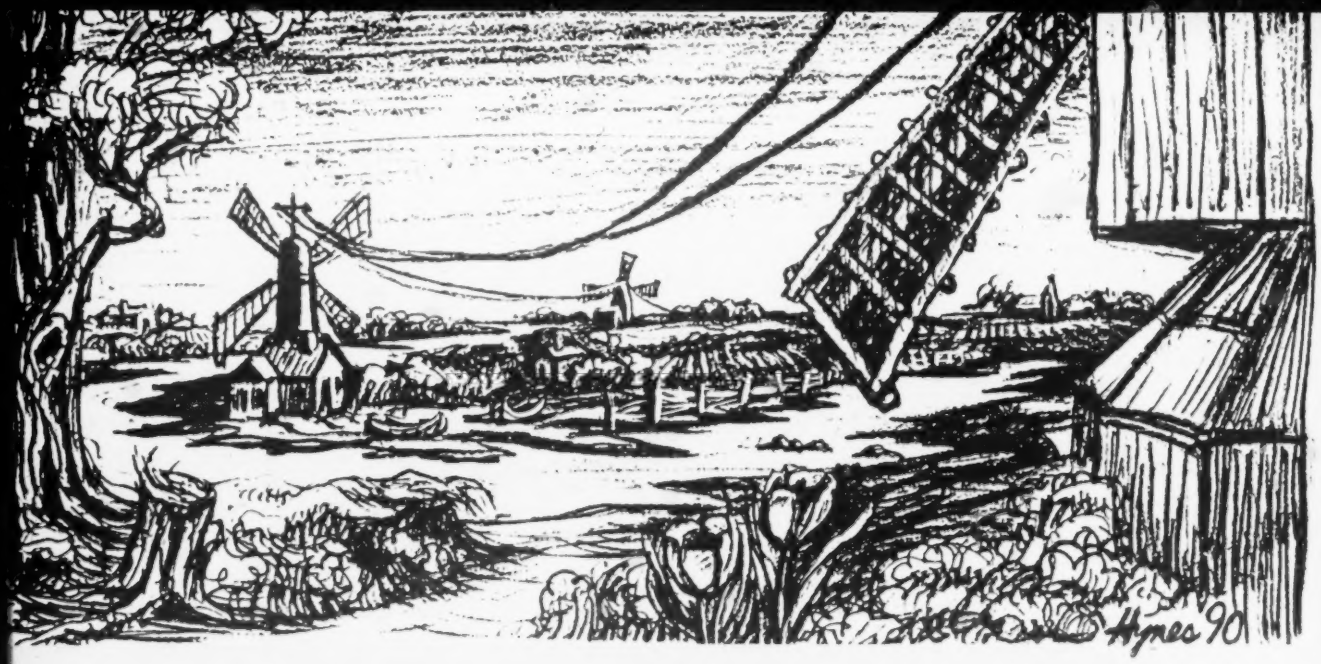

The Dutch solution

The telecommunications market in the Netherlands combines competition with its traditional PTT monopoly to serve an internationally inclined populace

JOHN WILLIAMSON, International Editor

In the time that it takes to read this sentence, telephone users in the Netherlands will make 60 international telephone connections. In 1990, the entire population of 15 million people will probably generate a staggering 200 million overseas calls.

The international orientation of the Dutch economy and society clearly has played an important part in shaping the new liberalized telecommunications regime that has been in operation for a little more than one year.

"The aim of the reorganization was to allow as much competition in as many fields as possible, given the size of the Dutch market and the constraint that the Netherlands, being an internationally oriented country, has to be assured of a network capable of competing with any network in the world," says Dr. Ben Verwaayen, one-time ITT Corp. executive and now president of Royal PTT Telecom Nederland NV.

A second major influence was the conviction that competition with the PTT would best flourish in the value-added services sector where market entry would be possible without huge preliminary investments in infrastructures.

"We concluded that value-added services were the most important because they would allow all kinds of new initiatives," says Verwaayen. "If you look at the first year, I think we were right. There has been an explosion of new, small enterprises offering a wide variety of services focused on product/market combinations and special applications."

The so-called Dutch solution to the problem of reconciling the competing claims of telecommunications monopolists and free marketeers was formally inaugurated Jan. 1, 1989. The new regime separates the postal and telecommunications functions into PTT Post BV and PTT Telecom BV. Regulatory power is exercised by a department within the national Ministry of Transport and Public Works. Although PTT Telecom is now completely owned by the Dutch government, during the next five years a large part of the company will be sold to the general public.

The new regime separates the postal and telecommunications functions into PTT Post BV and PTT Telecom BV.

From an operational point of view, PTT Telecom retains a monopoly on telephony, telex and data, and the transport thereof, under the terms of a 30-year concession. Competition is permitted in the provision of value-added services and customer premises equipment. In certain other cases such as community antenna television independent service providers are licensed.

Although there is no official desire to dismantle PTT Telecom's basic service monopoly right now, the new regulatory arrangements will not allow the organization to cruise through the 1990s on automatic pilot.

First of all, competition could be introduced in the reserved areas if PTT Telecom fails to meet its service obligations. Verwaayen takes this threat seriously.

"We have to file reports on dozens of performance issues and we are measured against those," he points out. "We have to meet cer-

continued on page 50

tain milestones regarding performance in relation to the customer, availability and reliability. I'm confident that we will exceed these requirements in many ways. In the cases where we fail, the government can take drastic measures."

Second, while PTT Telecom derives its authority from Dutch law, its power could be modified by European Commission (EC) rulings.

A case in point is basic data communications, which right now is reserved for PTT Telecom. At an EC meeting in late 1989 it was decided that independent service providers could be licensed in most European countries from the beginning of 1993. In practice, Verwaayen doesn't see much scope for competitors obliged to meet the same national service availability and performance criteria as his own organization.

"Maybe there will be, but under the same terms and under the same conditions as we have," he says. "So I feel comfortable with the idea of other parties doing the same." Nevertheless, the possibility of encroachment onto the reserved services does exist.

Again, competition in the Dutch value-added sector does not have to be simply a case of Big Brother versus a collection of Tiny Tims. As well as small local concerns, large overseas telecommunications operators may identify and exploit commercial opportunities in the Netherlands. Verwaayen is reconciled to this eventuality as long as opportunities are available overseas to PTT Telecom.

The most important obstacle to institutional complacency, perhaps, is the attitude and corporate culture of PTT Telecom. Verwaayen and his colleagues say they are determined to rescue customer service from the cliche status it has elsewhere.

"We don't sell technology, we don't sell hardware, we sell service," says Verwaayen.

In this context, the Dutch may have an intrinsic advantage over their European counterparts who also recently have experienced deregulation and liberalization. Historically, the telecommunications business of the Dutch PTT was not operated by a traditional government bureaucracy.

"The market and process orientation was not a bureaucracy in the sense of a government bureaucracy," claims Verwaayen. "We have had to be meaner and leaner than we were before, but basically the market orientation, the methodology of thinking, was already there."

Indeed, Verwaayen sees positive benefits arising from the modifications to the former monopoly. "We had to rethink our basic strategy, which was a healthy process," he says. "New opportunities were there to discover the basic needs of the customers and their perspectives and perceptions of what services should be, which are not necessarily the same as technical perceptions."

Under the new telecommunications regime, Dutch subscribers have witnessed a steady reduction in tariffs—up to 30% in some sectors—while service options have multiplied. There has been an early start in intelligent network services, the world's first pilot commercial international integrated services digital network service with West Germany in October of 1989 and, earlier this year, the trial of a 900-MHz prototype of the digital European cordless telephone system in a public service.

These initiatives are not just services for the sake of services. Offerings such as ISDN have to be justified by market demand.

"Sometimes you have the feeling that people are talking about ISDN in isolation from the marketplace," notes Verwaayen. "I don't like that. ISDN is a breathtaking opportunity, but only based on market demand."

Nor does PTT Telecom indulge in new technology for the sake of new technology.

"New services do not necessarily have to mean new technologies. It is sometimes surprising what existing technologies offer, what you can do with them and how you can make them more attractive," argues Verwaayen. "Many people think about new services only in terms of new technologies and new investments. We invest something like 40% of sales, and in my book that's a very high figure that I would like to see go down a little bit."

Not all of PTT Telecom's ventures have been runaway successes. The ill-fated, one-stop shop Managed Data Network System (MDNS), which was to have involved many of Europe's PTTs, was a Dutch initiative. Verwaayen

PTT fact file

PTT Telecom BV, a subsidiary of Royal PTT Nederland NV, has five separate business units: national networks, business markets, international telecommunications, consumer markets, and telematics, systems and services. Its main equipment suppliers are Philips, AT&T Network Systems International, LM Ericsson, Alcatel and Krone.

Employees: 29,000

Investment in telecom infrastructure in 1989: $2.7 billion

Profits in 1989 (estimated): $600 million

Telephone subscribers (main lines): 6.5 million

Lines in 1989: 7.2 million

Exchanges: 1330

Traffic: 6.4 billion inland calls, 186 million international calls, 28 million outgoing mobile telephone calls

Public call boxes: 6800 (plus another 1100 public phones)

blames its failure on the number of participants and their diversity. MDNS was a CEPT approach that involved 23 different PTTs.

The Netherlands has begun to negotiate deals with individual and small groups of overseas operators, including France Telecom, Deutsche Bundespost Telekom, Telefonica, British Telecom and Singapore Telecom. One of the first major achievements will involve France Telecom and Deutsche Bundespost Telekom in an electronic data interchange network for the European transportation industry.

Similar initiatives in the future may involve non-PTT organizations, although whether PTT Telecom will follow the example of its West German counterpart and try to deal with IBM is not known.

The coming years also should see new developments in mobile communications. Two Inmarsat coast earth stations currently under construction are scheduled for completion in the fourth quarter of this year and are being equipped to handle A-, C- and the forthcoming all-digital B-standard traffic. This development will allow PTT Telecom to provide new mobile services in the Atlantic and Indian Ocean regions, as well as long-distance land links for trucks and other vehicles throughout western Europe.

Personal communications also will be emphasized in the future, although the form it will take has not yet been resolved.

"I would say that in the mobile markets, personal communications is the winner in the future," says Verwaayen. "But I'm not convinced we have the right solution yet to make it happen for everyone."

PTT Telecom's mission in the 1990s is to be a leader in the provision of new demand-led services, in partnership with others where appropriate, and to operate its remaining monopoly in a responsive and responsible manner. "Monopoly as a concept by itself is only good when it is operated as if there is competition," says Verwaayen. ■

R E L I A B L E

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